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Report Highlights:

Biodiesel production is expected to remain flat in Malaysia at 1.58 billion liters, as the country is likely to remain at a B10 blend rate as B20 and B30 mandate goals have not advanced. Recent proposals for the country's 2025 budget limiting fuel subsidies are projected to decrease consumption slightly in the short term, while a change in the palm oil export tax structure may incentivize more downstream production, such as in biofuels. The country looks towards the further harnessing of local palm products for biofuels with the final investment of a Sustainable Aviation Fuel refinery in the state of Johor and operational plans by 2028. Noting the ample feedstock of palm, there is not a market in Malaysia for fuel ethanol at this time.

Section I. Executive Summary

In the refining of biofuel in Malaysia, the country's large supply of palm oil is used as feedstock and is derived from processed palm oil (PPO), crude palm oil (CPO) and processed palm kernel oil (PKO). Biofuels are processed in 17 refineries throughout Malaysia. While historically fuel prices have been subsidized to support economic growth, in an effort to reign in government spending during the reveal of the 2025 Malaysian Budget, Prime Minister Anwar Ibrahim announced that blanket subsidies on RON95 petrol (the most widely-used in Malaysia) will end in favor of a two-tier pricing system by mid-2025. This comes after blanket diesel subsidies were removed in the summer of 2024, while allowing special considerations to Borneo, public transport, and fisheries to still apply the subsidies.

Malaysia biofuel policy is created in line with Malaysian commitment to the Paris Agreement of the United Nations Climate Change Conference (UNFCCC). The Government of Malaysia (GoM)'s intention to roll-out B20 mandate by 2023, has yet to materialize and the goal of a B30 mandate has been pushed to 2030. Currently, only the State of Sarawak and the islands of Labuan and Langkawi have implemented a B20 mandate.

Sustainable Aviation Fuel (SAF) has been an increasingly popular topic. Malaysia's national petroleum company, Petronas intends to expand the production of Sustainable Aviation Fuel (SAF) using waste-based feedstocks such as used cooking oil (UCO) and palm oil mill effluents (POME) in a new refinery set to be operational in 2028. At full operations it is expected to process around 650,000 metric ton/year of feedstock to produce 700 million liters per year of SAF.

Malaysia has also committed to reduce 45 percent of Green-House Gases (GHG) emission intensity to gross domestic product by 2030. As part of this commitment, the GoM announced the implementation of a voluntary carbon market (VCM) in late 2022 in which private companies can purchase carbon offsets/credits to compensate for their emissions from the Bursa Carbon Exchange (BCX), run by Bursa Malaysia (the country's stock exchange).

Section II. Policy and Programs

To promote the development and usage of palm biodiesel for commercial sector in Malaysia, GoM introduced the [National Biofuel Policy \(NBP\)](#) in 2006. The NBP aims to promote the use of palm methyl ester (palm oil) as the blending mix to petroleum diesel with the aim to reduce GHG by 45 percent of GDP by 2030, expand the use of downstream palm oil products, and reduce Malaysia's dependence on fossil fuels. It defines five core focuses for biofuels for industry, transportation, and export; biofuel technology; and biofuels for a cleaner environment. To enable enforcement of the policy, the Malaysian Biofuel Industry Act 2007 (Act 666) includes regulations of:

- [Malaysian Biofuel Industry \(Blending Percentage and Mandatory Use\) Regulations 2019-PU\(A\) 27](#)
- [Malaysian Biofuel Industry \(Licensing\) regulations 2008 PU\(A\) 404](#)
- [Malaysian Biofuels Industry \(Blending Percentage and Mandatory Use\) \(Amendment of Schedule\) Regulations 2019-PU\(A\) 129](#)
- [Malaysian Biofuel Industry \(Compounding of Offences\) Regulations 2021-PU\(A\) 13](#)

The act provides standards for biofuels as determined by the Department of Standards Malaysia. These standards are related to engine fuel performance and not environmental performance criteria. In addition, the act provides licensing procedure, distribution and exemption of usage and power to the Ministry of Plantation and Commodities to enforce the act.

Renewable Energy and GHG Emissions

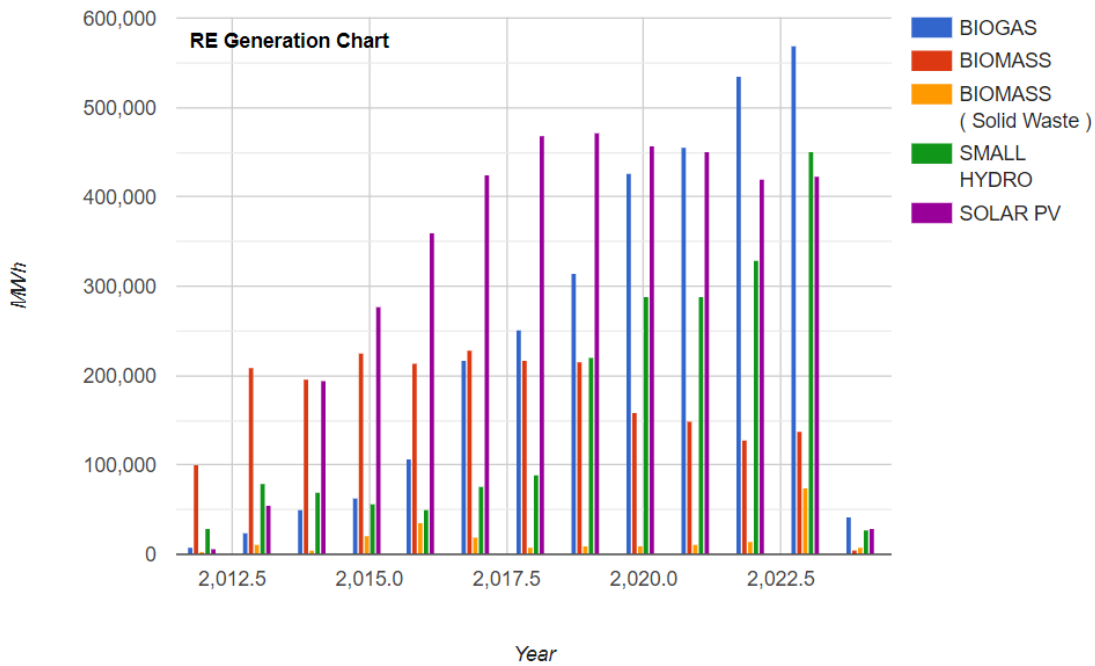
At the 23rd Conference of the Parties to the United Nations Framework Convention on Climate Change (COP23) in November 2017, the Malaysian Minister of Water, Land, and Natural Resources highlighted Malaysia's commitment to reduce carbon emissions by at least 13 million tons CO₂e by 2030. One of the key mitigation actions in this [“Energy Efficiency Action Plan”](#) is the use of CPO in blended petroleum diesel (3.3.1.6- Palm oil-based fatty acid methyl ester-Biodiesel). In July 2021, Malaysia's [latest update](#) on the nationally determined contributions (NDC) registry submitted to the United Nations' Framework Convention on Climate Change (UNFCCC), a goal of reducing their economy-wide carbon intensity by 45 percent compared to 2005 levels was listed.

National Energy Transition Roadmap

The [National Energy Transition Roadmap \(NETR\)](#) was launched in August 2023 in an effort to outline a path for a sustainable energy system by the GoM. The roadmap aims to achieve net-zero emissions by 2050. To help ensure Malaysia achieves goals towards lower carbon-intensity and increased sustainable energy use, the Ministry of Plantation and Commodities (MPC) proposed to roll-out the B30 mandate for commercial transportation sector by the year 2025, however noting delays in the implementation of the B20 mandate (which is yet to become nation-wide), plans for B30 were pushed to a goal of 2030 as part of the second phase NETR rollout in August 2023.

In addition to ministries such as Ministry of Plantations and the Department of Standards, the implementation of the Renewable Energy (RE) policy in Malaysia, including the Malaysia Renewable Energy Roadmap, is under the purview of the Ministry of Science, Technology, and Innovation (MOSTI) through the [Sustainable Energy Development Authority \(SEDA\)](#). The Authority has many RE programs, though at this time a majority focus on solar energy rather than biomethane. Nevertheless, biomethane remains a leader in renewable energy generation under Malaysia's Feed-in-Tariff (FiT) program. Through FiT, sustainable energy technologies can be developed with an incentivized return as eligible renewable electricity generators are paid a cost-based price for the energy they supply to the grid. Most of the biomass and biomethane applicants are from the palm oil industries as they have abundant and consistent supply of empty fruit bunches (EFB) and Palm Oil Mill Effluent (POME) as the feedstocks,

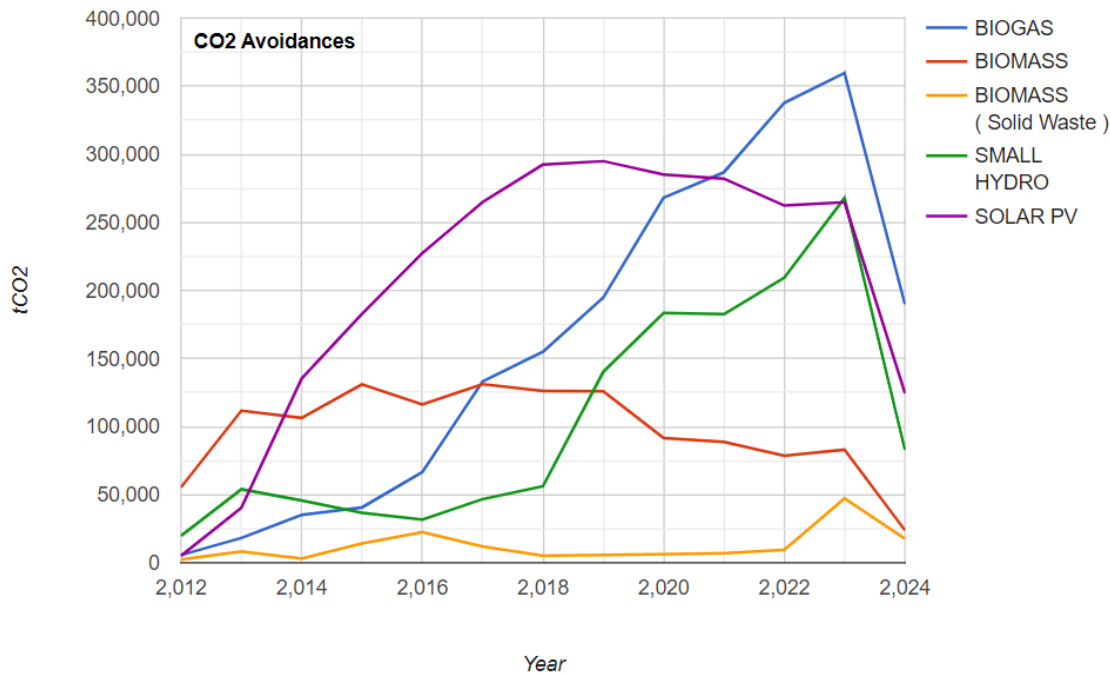
Graph 1: SEDA FiT program RE Generation (2012-2024)



Source: SEDA

From 2012-2022, according to SEDA and based on the total RE generated, the total amount of CO2 emissions avoided from the conventional fossil fuels plants under RE programming was 6,237,383 tonnes. Solar PV has displaced most of the CO2 emissions at 38%, followed by biomethane, biomass, and small hydro RE resources at 26%, 20%, and 16% respectively.

Graph 2: CO2 Avoidance for plants under SEDA RE programming (2012-2024)¹



Source: SEDA

POME Management Across the Palm Oil Mill Industry

Palm Oil Mill Effluent (POME) is the waste from the milling process of oil palm fresh fruit bunch (FFB) to produce CPO. If untreated, POME causes water pollution and biomethanerelease to the atmosphere. Industry standard practice is to treat POME in open wastewater ponds, and once it reaches the minimum permitted level of Chemical Oxygen Demand (COD) and Biological Oxygen Demand (BOD) set by the local authority, it is released. The sludge from the pond then dried and used as fertilizer or mix as an aggregate in building materials. As this process releases GHG, especially biomethanegas, into the environment, some millers trap these gases to generate electricity. This electricity may either be used at the mill or connected to the grid for use by the community.

Based on Malaysia’s biennial update report to the United Nations, in 2010 under the Economic Transformation program Entry Point Project initiative on Developing Biogas Facilities at Palm Oil Mills, the GoM mandated that from January 1, 2014, all new mills and all existing mills applying for expansion must install biomethane capture facilities or biomethane avoidance facilities. Funding for the facilities come from private sources, with an estimated investment of USD\$650 million for all of the mills. As of 2020, 125 out of 452 palm oil mills were fully equipped with biomethane capture facilities. Unfortunately, the downside to this program is that existing mills not applying for expansion have no requirement or incentive to install biomethanecapture or avoidance facilities. In the last five years, no mills have volunteered to take on this costly initiative.

In addition to biomethane capture, another initiative taken to reduce GHG is through filtering solid waste from POME by using filter belt press technology. The filter belt press is a device used to

¹ Note that 2024 values are not complete, thus the large decrease at the end of the graph should be understood in this context.

chemically enhance the separation of POME into a filtrate (wastewater) and a solid press cake (solid organic matter). With less or no solids from POME present in the water, the formation of biomethane gas is reduced, and the solid press cake produced can be used as organic fertilizer.

According to a study by CPO producer KLK, Neste, International Sustainability and Carbon Certification – ISCC, and IDH Sustainable Trade Initiative, this system can reduce the mill’s daily emission of CO₂e by 20.6 tons, equivalent to 0.13kg of CO₂e per 1 kg of CPO produced. Compared to a biomethane capture facility, the filter belt press technology incurred low investment and running cost and is applicable to any size of mill currently in operation. However, this system is also voluntary, and since the study was published by RSPO in November 2018, no data has been made public to quantify GHG savings.

Biofuel Policy Framework and Mandates

The GoM released its National Biofuel Policy (NBP) in 2006 with the stated objectives of utilizing environmentally friendly and sustainable energy sources to reduce dependency on fossil fuels, and to help stabilize the palm oil industry. In 2007, the Malaysian Parliament passed the Biofuel Industry Act, which included provisions from the National Biofuel Policy, to implement a biodiesel blend mandate. Three main objectives of the NBP were to reduce the greenhouse gas (GHG) emissions rate target of 45 percent of GDP by 2030, to expand the use of downstream palm oil products to increase the income of palm oil smallholders through price control mechanisms and to limit Malaysia’s dependency on fossil fuels. The MPOB under the MPC is the agency entrusted to implement the Palm Biodiesel program in Malaysia.

While the vast majority of domestically produced biodiesel is used by the transportation industry, the GoM also requires its use in the industrial sector (mainly to heat boilers and generate electricity). In July 2019, the GoM rolled out a seven percent blend mandate for the industrial sector.

History of Biodiesel Mandates in Malaysia for Transportation

B5 mandate: a key part of the 2006 NBP, calling for 5 percent palm methyl ester with 95 percent petroleum. Regional rollout began in 2011, and nation-wide status was reached in 2014.

B7 mandate: Initial rollout began in 2015 and was implemented throughout Peninsular Malaysia by 2017. In 2019, the mandate was added, and adopted, in Borneo as well, making it nation-wide. The plan is cited as stabilizing palm prices, increasing palm oil demand 700 to 800 thousand metric tons (TMT) a year, and decreasing GHG emissions by two-million tons annually.

B10 mandate: Announced in 2018 as part of the GoM’s plan to increase renewable energy usage, the mandate was fully implemented in Peninsular Malaysia in February 2019 and nation-wide by September 2019. The government is currently considering extending the B10 mandate to the industrial sector in the future.

B20 mandate: While announced in 2020, the rollout of the B20 mandate was delayed due to the COVID-19 pandemic, high palm oil prices, and insufficient blending facilities. The B20 mandate is yet to be realized nationwide and is still only in select areas of Sarawak, Langkawi, and Labuan

B30 mandate: Initial proposals called for a B30 mandate to be realized by 2025, plans for B30 were pushed to a goal of 2030 as part of the second phase NETR rollout in August 2023.

Financial Supports

To ensure the nation's biofuel program is financially viable, the GoM uses an Automatic Pricing Mechanism (APM) to set biodiesel prices. The GoM has not published the formula for this calculation, and while studies have been done and are credible for how GoM calculated the B7 formula, it is unknown if the government's calculation has changed for B10 and above blend rates.

To finance the development of the palm oil industry, GoM collects a levy from every ton of CPO produced by millers. The CESS Order, stipulated under the Malaysian Palm Oil Board Act 1998 (Act 582) is a fee levied by the Malaysian government to support and develop the palm oil industry in Malaysia. It is widely known as the "windfall levy". Since its introduction, the amount of levy paid by millers per ton of CPO produced has steadily increased (nominal value) from RM11 (\$2.47) in 2000 to RM16 (\$3.60) in 2021. Around 80 percent of the levy collected is allocated for research and development, regulatory, and promotional activities, 15 percent for replanting and biodiesel subsidies, and five percent for environmental protection initiatives. In 2023, it is estimated the CESS levy garnered approximately RM 331 million (\$76 million).

To ensure the industry has the blending infrastructure to support a B30 mandate in the future, five petroleum companies— Petronas, Shell, Petron Malaysia Refining, Chevron Malaysia, and Boustead Petroleum Marketing - agreed to upgrade 35 petroleum blending facilities across Malaysia from 2020. As of 2023, fifteen facilities have been upgraded.

Flex-fuel, Plug-in Hybrid and Electric Vehicle Incentives

To promote the adoption of battery electric vehicles (BEV) in Malaysia, in the 2022 budget tabled by the Ministry of Finance, tax incentives were given for the purchase of fully imported BEV until the end of 2024 and for locally assembled models until the end of 2025. The incentives included exemptions of import and excise duty on fully imported BEV as well as road tax. In addition, those who purchase, lease, subscribe or install an EV charging port will be entitled to a one-time personal tax rebate up to RM2,500. Before the incentives, excise duty and taxes for fully imported BEV were roughly around 100 percent. In the budget tabling for 2023, the tax exemptions were extended to December 31, 2027, for locally assembled models.

According to the Malaysia's Investment, Trade, and Industry Ministry (MITI), a total of 2,585 EV charging units have been installed by 2024, much lower than the target of 10,000 in 2025. Malaysia aimed to have 100,000 BEVs on the roads by 2030 of which 50,000 are expected to be commercial BEVs, in addition to install 10,000 charging stations nationwide by 2025.

For Flex Fuel Vehicles such as Plug-In Hybrid Electric Vehicles (PHEV) and Hybrid vehicles, GoM do not provide the same exemption as BEVs. For locally assembled PHEV and Hybrid vehicles, incentives given to car manufacturers by GoM are specific to the car manufacturers. Currently there are roughly 80,000 petrol-electric hybrid vehicles of various types and 2,700 diesel-electric hybrids registered in Malaysia.

Biofuel and Petrol Subsidies

In 2023, over 50 billion Malaysian Ringgit (RM) was spent on direct fuel subsidies. However, in an effort to reign in government spending on October 18, 2024, during the reveal of the 2025 Malaysian Budget, Prime Minister Anwar Ibrahim announced that blanket subsidies on RON95 petrol (the most

widely-used in Malaysia) will end, leading to a two-tier pricing system in which the top 15 percent of earners in Malaysia will no longer have access to the subsidy by mid-2025. This comes after blanket diesel subsidies were removed in the summer, while allowing special considerations to Borneo, public transport, and fisheries to still apply the subsidies. Industry sources believe there will be negligible impact from the removal of these subsidies; rather, removal of the subsidies will reduce the improper trade and use of the fuels.

Import Policy, Import Duties, and Export Taxes

Palm oil production, supply and distribution in Malaysia is regulated by the Malaysia Palm Oil Board (MPOB). Palm oil faces an export tax that is staggered in levels based on the current price of CPO. In October 2024, during the 2025 budget tabling, Prime Minister Anwar proposed a revised export tax structure that would include higher tax levels beyond the current maximum of RM 3,450 per metric ton and above the current maximum eight percent duty rate. Analysts believe this proposal could lead to a more stable domestic supply of CPO to promote production of value-added products such as biodiesel.

Chart 2: Present vs. proposed CPO export duty rates

Price Range per metric ton	Present Export Duty Rate	Proposed Export Duty Rate
< RM 2,250	NIL	NIL
RM 2,250 – RM 2,400	3.0%	3.0%
RM 2,401- RM 2,550	4.5%	4.5%
RM 2,551- RM 2,700	5.0%	5.0%
RM 2,701- RM 2,850	5.5%	5.5%
RM 2,851- RM 3,000	6%	6%
RM 3,001- RM 3,150	6.5%	6.5%
RM 3,151- RM 3,300	7%	7%
RM 3,301- RM 3,450	7.5%	7.5%
RM 3, 451- RM 3,600	8%	8%
RM 3,601- RM 3,750		8.5%
RM 3,751- RM 3,900		9%
RM 3,901- RM 4,050		9.5%
>RM 4,050		10%

Below the are the current import/export duties and sales taxed applicable for ethanol, gasoline, petroleum products containing palm biodiesel, and biodiesel palm methyl ester.

Table 6: Import duties and export taxes (2023)

HS Code	Description	Duty Rate (%)		Sales Tax	Import License	Export License
		Import	Export			
2207.10 2207.20	Undenatured ethanol Denatured ethanol	RM60/100% vol / liter	0% 0%	10% 10%	Yes	No
2710.12	Unblended Gasoline	0%	0%	RM0.60/liter	No	Yes
2710.20	Petroleum containing 30% or less biodiesel	0%	0%	10%	No	No
3826.00	Biodiesel Palm Methyl Ester	0%	0%	10%	No	No

Source: The Malaysian trade classification and customs duties order

Section III. Ethanol

Although there are sugarcane plantations in Malaysia, a lack of economies of scale and high costs make non-beverage ethanol production using cane or molasses untenable. Beyond these considerations, the supply of sugarcane is simply insufficient for any fuel ethanol program of scale given existing domestic demand in sugar milling, molasses for feed as well as potable and industrial uses for ethanol. A small amount of ethanol using POME is produced in palm plantations throughout the country to generate electricity. However, this production is not on a commercial scale. Malaysia has been unwilling to create a fuel ethanol program that would be heavily or solely reliant on imported feedstock or ethanol despite benefits of such a program that would improve air quality to provide health benefits and lower GHG emissions to help mitigate climate change.

Section IV. Biodiesel

Table 1: Malaysia Biodiesel Production, Supply, and Distribution (in million liters)

Biodiesel (Million Liters)										
Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024f
Beginning Stocks	42	76	32	141	181	509	700	646	425	416
Production	743	595	854	1,100	1,778	1,249	1,197	1,151	1,580	1,580
Imports	0	2	0	75	243	196	102	94	211	210
Exports	194	131	227	600	828	456	490	511	802	810
Consumption	515	510	518	535	865	798	863	955	998	995
Ending Stocks	76	32	141	181	509	700	646	425	416	401
Production Capacity (Million Liters)										
Number of Biorefineries	18	17	16	15	19	19	18	18	17	17
Nameplate Capacity	2,527	2,248	2,239	2,174	2,426	2,426	2,332	2,362	2,726	2,726
Capacity Use (%)	29.4%	26.5%	38.1%	50.6%	73.3%	51.5%	51.3%	48.7%	58.0%	58.0%
Feedstock Use (1,000 MT)										
Crude Palm Oil (CPO)	683	547	786	1,012	1,636	1,149	1,101	1,059	1,510	1,510
Market Penetration (Million Liters)										
Biodiesel, On-road use	515	510	518	535	745	665	720	760	798	790
Biodiesel, Industrial use	0	0	0	0	120	133	143	195	200	205
Diesel Pool, On-road use 1/	7,342	7,246	7,351	7,639	7,447	6,637	7,168	7,605	7,980	7,900
Blend Rate (%)	7.0%	7.0%	7.0%	7.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Diesel Pool 1/	11,938	11,647	12,517	12,571	14,149	13,430	13,995	14,226	14,916	15,466

Note 1/ Covers diesel and all biocomponents (biodiesel) and renewable diesel when used.

F= forecast

Sources listed in section VI.

Consumption

Total consumption of biodiesel for calendar year 2024 is estimated at 995 million liters, with 790 million liters for on road use and 205 million liters for industrial use. For CY 2024, the blend rate for on-road use, is at 10 percent and for industrial use is at 7 percent. Although the GoM planned to increase the blend rate for on-road use to 20 percent from 10 percent in 2023, it the goal was not realized due to the high cost of increasing the blend rate that would be passed to the consumer. Consumption and use is forecast slightly lower than CY 2024 due to the blanket subsidy removal of biodiesel products that went into effect in summer of 2024 which is suggested to have decreased movement of biofuels across borders.

Production

According to industry figures, there are 17 active biodiesel plants currently in operation with capacity of 2.7 billion liters. The introduction of the European Union's (EU) Renewal Energy Directive (REDII) in 2019 saw exports to the EU, Malaysia's largest biodiesel market, start to decline. As noted above, GOM introduced a B10 mandate in 2019 to make up for the reduced export market, and since then production of biodiesel is primarily intended for domestic consumption.

Feedstocks for Malaysia's biodiesel production are primarily from palm oil products, namely crude palm oil (CPO), processed palm oil and processed palm kernel oil as they are abundant, easily, and readily available to biodiesel processors. Used cooking oil (UCO) is also an option as is tallow and POME. However, no incentives are established to support lower carbon intensity biofuels and so these waste stream products go unused by the biodiesel industry. UCO is collected by private companies and is intended for the export market where it fetches a higher price. Recently, Malaysia's national oil

company, Petronas, announced a pilot UCO collection program at selected petrol stations. This is in anticipation of Petronas' upcoming SAF project plant scheduled to begin operation in 2028.

Trade

Biodiesel

Malaysia's biodiesel exports in 2024 are forecast at 810 million liters, 8 million liters higher than 2023. The EU remains the largest export market for Malaysia's biodiesel, Singapore, the United States, and China. Malaysia imports of biodiesel is projected slightly lower for 2024 based on year-to-date data, largely originating from Indonesia.

Used Cooking Oil

Malaysia has witnessed a significant increase in UCO exports in 2023 and 2024, with quantity exported projected to triple in just one year. This increase is due to the increase in U.S. and European demand for UCO to produce biofuels; however, questions over traceability and composition of product remain a concern for the market. The largest increases in exports for the first eight months of 2024 were to the Netherlands (846 percent increase over the same timeframe in 2023), the United States (489 percent increase), and Spain (661 percent increase).² To a lesser extent, Malaysia's imports of UCO have also increased over the past 5 years from Indonesia, Germany, and China.

Section V. Advanced Biofuels

Sustainable Aviation Fuels

Production of sustainable aviation fuels (SAF) is still at the infancy stage, and there is no commercial production currently. According to industry players, there are three sources of feedstock for SAF projects in Malaysia: UCO, CPO and micro-algae. For UCO, the challenge is in collection, as there are limited collection centers, and much of the UCO that is collected is already absorbed by export markets. In October 2023, Malaysia's national petroleum company, Petronas established pilot collection centers for UCO in three of their gas stations in Klang Valley. This program is in preparation for their upcoming SAF plant that is expected to be operational by 2028.

Section VI. Notes on Statistical Data

Trade data

All trade data on used cooking oil (UCO, HS Code 151800) and biodiesel (HS 382600) are from Trade Data Monitor. sourced from Trade Data Monitor. Consumption data obtained from EIA, and pool figures from IEA.

Conversion Rates:

Palm Methyl Ester Biodiesel

1 metric tons (MT) Palm Methyl Ester = 1,136 liters Palm Methyl Ester

1 metric tons (MT) crude palm oil = 1,087 liters of Palm Methyl Ester

² Data obtained from Trade Data Monitor using HS code 151800

Attachments:

No Attachments